

Relocation of the Deep Space Network Maintenance Center

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The Jet Propulsion Laboratory maintains a Deep Space Network (DSN) Maintenance Center (DMC), whose task is to engineer and manage the repair and calibration program for the electronic and mechanical equipment used in the tracking stations located at Madrid, Spain, and Canberra, Australia. The DMC also manages the Goldstone Complex Maintenance Facility (GCMF), whose task is to repair and calibrate the Goldstone electronic and mechanical equipment. The combined DMC and GCMF is operated by the Bendix Field Engineering Corporation under contract to JPL. Prior to January 1981, the DMC and GCMF were located at the Goldstone Echo site. This paper discusses the rationale for moving the facility to Barstow, California, and the benefits derived from the move. . .

I. Introduction

The DSN Maintenance Center (DMC) provides the centralized technical repair function for the Deep Space Network. Prior to January 1981, it was located at the Goldstone Deep Space Communications Complex, 72.4 km north of Barstow, California.

As early as 1970, a problem was recognized in relation to having the DSN Maintenance Center located near Deep Space Station 12. Specifically, the proximity of the DMC to DSS 12 resulted in interference to DSS 12 tracking operations by spurious radiation (RFI) of both S- and X-band signals emanating from RF test equipment used in the DMC. Owing to the interference, controls had to be placed on RF testing activities at the DMC. Variations in shift schedules to accommodate the tracking, test, and maintenance activities created extra expense and had adverse effects on employee morale. Because of these

problems, a study was made of the feasibility of relocating the DMC and GCMF to an off-site area. This study was initiated in July 1979.

II. Statement of Problem

During the early 1970's when Goldstone was developing an active RFI program, it was noticed that during the testing and repair of certain RF exciter modules at the DMC, DSS 12 would report spurious spikes on its received signal. Investigation proved that signal generators being used at the DMC, which was 250 meters northwest of DSS 12, were creating the interference. Furthermore, the DMC and GCMF were located in five separate buildings throughout the Goldstone Complex. This dispersment over a wide geographical area created both supervisory and communications problems which had a detrimental effect on operations. Decentralized activity required

extra transportation, created nonproductive time due to the increased travel requirements, and caused equipment backlogs and excessive overtime.

As a quick-fix approach, the DMC explored the feasibility of moving the RF portion of the facility to the Microwave Test Facility, which is located approximately 2 km from DSS 12 and has natural terrain as RF shielding. This approach was abandoned because of inadequate available floor space.

Another option was to contract the work out to a vendor, but that approach was deemed too costly because of additional spares which would have to be procured to keep the supply pipeline full. The requirement for additional floor space to support existing and planned increases in workload was also considered.

III. Solution of Problem

An initial finding of the feasibility study was that no DSN operations requirements precluded the relocation of the DMC and GCMF to an area remote from the Goldstone Complex. Based on this finding, approval was obtained from the Telecommunications and Data Acquisition Office to relocate the facility in Barstow, California.

In designing the relocation plan, the following criteria were followed:

- (1) The DMC/GCMF functional capabilities had to be preserved.
- (2) Any relocation was to have a minimum adverse impact on personnel and morale.
- (3) The DMC/GCMF was to provide support continuity during relocation.
- (4) Energy conservation guidelines and goals had to be met.
- (5) Cost savings must be realized from the relocation.

A suitable facility was found in central Barstow that had the necessary floor space and also met the required selection criteria. An extensive RFI compatibility study revealed that no mutual RFI condition would be created as a result of the DMC/GCMF operations in the Barstow area.

Based on facility availability and RFI compatibility, a final study was conducted and a presentation of the results made to

cognizant JPL management personnel. The direct cost savings, cost avoidance, and energy savings justified the decision, made in early 1980, to relocate the DMC/GCMF as well as some of the Goldstone indirect tracking support functions. A formal relocation plan was developed, approved and placed into effect coincident with completion of facility modifications. The actual relocation occurred in March 1981.

IV. Benefits

In addition to eliminating the DSS 12 RFI problem, relocation of the DMC/GCMF to the Barstow area provided the opportunity to effect significant cost savings and cost avoidance in the areas of personnel transportation, facility operations, fuel, and future Goldstone Facility construction. The more significant benefits are described below:

- (1) The existing RFI problem between DSS 12 and the DMC was eliminated.
- (2) All DMC/GCMF functions were consolidated into a common facility. This will improve operational effectiveness and reduce costs.
- (3) The new facility benefits from commercial power rates as contrasted to the prime energy rates prevailing at Goldstone.
- (4) A savings in transportation costs of \$115,000 per year will be realized, and safety will be enhanced.
- (5) Barstow, being a more desirable work location than Goldstone, will attract prospective employees.
- (6) Sufficient space is available in the new building to allow relocation of other Goldstone functions that are not required in direct support of tracking operations.

V. Summary

A total of 71 personnel were relocated from Goldstone to the Barstow Facility. Of the total relocated, 54 were DMC and GCMF personnel and 17 were Goldstone Complex support personnel identified as indirect support personnel.

Occupancy of the facility actually began in October 1980, after the offices and laboratories were completed. The final phase of the relocation took place in January 1981. An open house and dedication ceremony, to mark the completion of renovations and occupancy of the facility, was held in March 1981.